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Approved For Release 2005/12/23 : CIA-RDP79B00314A000500050011-0

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31 July 1964

MEMORANDUM FOR: Deputy Director of Science and Technology

SUBJECT: Drell Committee Follow-on Activities

REFERENCE: a. Report of Photo Working Panel on the C/M System,
8 February 1964 [REDACTED]
b. [REDACTED] Memorandum to (S) D/NRO,
DD/S&T, Same Subject, 2 April 1964 [REDACTED]

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1. In response to your request, there follows a summary of the status of current and planned activities for implementation of recommendations made in reference a. These activities are divided into three categories (reference b):

- a. Image quality evaluation and standardization. (NPIC)
- b. Resolution probability program. (NRO)
- c. C/M measurement program. (NRO)

2. The image quality evaluation and standardization program is being pursued by NPIC. To this end, a committee with the following membership has been formed:

[REDACTED]

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This committee had its initial meeting on 13-15 July 1964 at NPIC. NPIC is supporting the following programs at the facilities indicated:

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a. [] Work will be done on GEMS and edge trace analysis. The results of a current study of the subjective aspect of the GEMS problem (in conjunction with SAS/DD/S&T and []) will be made available to this committee.

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b. [] Work will involve edge trace studies. Also, a study will be undertaken on the comparison of operational and standard edges through a split-field microscope in a manner similar to the GEMS comparisons.

c. [] Studies on grain noise will be carried out with a view toward minimizing its effect on edge measurements. Attention will also be given to computer processing of edge trace data, particularly the smoothing problem.

d. National Bureau of Standards. NBS will be responsible for the overall problem of standardization of microdensitometric measurements. In this regard NBS will provide physical standards for use in calibrating microdensitometers. In addition, NBS will study photomicrographs of edges and associated computer processing.

e. [] [] will represent [] on the committee [] at its own request, will not initiate any additional programs in this area.) It is [] feeling that their edge trace programs already in process under separate contracts are sufficient. [] will advise on matters of film characteristics and processing.

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f. NPIC. NPIC's in-house research facility will be used to investigate the analysis of edges with coherent optical techniques.

g. [] [] will have no specific task, but will work with and advise committee members on the psychometric aspects of testing and evaluation, (GEMS, etc.) and contribute statistical analyses and support.

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The above program is scheduled for one year, at a cost of about [] More detailed information on individual items is available if desired.

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3. The resolution probability program will be concerned with the frequency distribution of product quality from the C/M system. It is planned that this effort will be undertaken by [] Conversations with [] indicate that the program is still in the contract negotiation stage and no technical work has been accomplished to date.

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4. The following information on the C/M measurement program is based upon conversations with [] NRO:

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a. This program is divided into in-flight and laboratory experimentation. The only in-flight experiment performed to date was the use of two different filters, Wratten Nos. 25 and 21, on the two cameras in a particular mission []. Results are being analysed by [] and should be available presently. Some "quick and dirty" tests of the effects of thermal gradients on the C/M lens have been performed at []. These tests included radial temperature gradients and thermal shock. On the basis of these tests, [] concluded that there was no significant thermal degradation of lens performance. However, these tests were performed under somewhat equivocal conditions, i.e., not in vacuum, high precision collimator not used, etc. Hence NRO has solicited from [] proposal for more refined thermal gradient experiments. Nothing, to date, has been done in other areas of interest, viz., vibration effects, soft spots, etc. It is planned that [] will investigate these areas in the near future.

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5. A suggestion made by [] (S) D/NRO, during the Photo Working Panel briefing on 8 February 1964 has been pursued. Dr. [] suggested that 3-bar target resolution measurements on the lens and complete camera in the laboratory be augmented by simultaneous edge photography and analysis. Initial results indicated that the resolutions inferred from edge trace analysis are of the order of 25% greater than those obtained with 3-bar targets. However, [] feels that the edges used in these tests were inadequate. Itek has since designed a rather elaborate special target, including a step tablet, for this purpose. This target is currently being fabricated, and upon its completion, the experiment will be repeated.

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6. ORD participation in the Image Evaluation Committee will keep us abreast of continuing developments over the life of the program.

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